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Optimization of Bioethanol Production by a Flocculating *Saccharomyces* cerevisiae using Simultaneous Saccharification and Fermentation Technology

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Bioethanol production from lignocellulose sources such as wheat straw (WS) requires enzymatic hydrolysis of cellulose to release sugars (saccharification) that can subsequently be fermented by yeast to ethanol. One way to perform this reaction at high dry matter condition is by a simultaneous saccharification and fermentation (SSF) procedure [1]. On other hand, in order to increase the fermentable sugars concentration it is necessary to improve the availability of cellulose in the substrate by removing non-cellulosic materials under different kind of pretreatment. For that reason the aim of this study was to use WS biomass as lignocellulosic raw material fractionated by a hydrothermal pretreatment for being used in a batch SSF process for ethanol production, evaluating the effect of substrate, temperature and enzyme loading. Substrate for SSF (WS), was treated under autohydrolysis process (180 ºC/ 20 min) [2]. A full factorial design 2^3 was used for the optimization of the pretreated WS to improve SSF ethanol production. The highest ethanol yield was 78.4%, respect to the theoretical conversion yield at 45 ºC, 2.5% of substrate and 17.35 FPU/mL of cellulase. Ethanol can be successfully produced from wheat straw by SSF.

[1] Alfani F, Gallifuoco A, Saporosi A, Spera A, Cantarella M, “Comparison of SHF and SSF processes for the bioconversion of steam-exploded wheat straw”, *J. Ind. Microbiol. Biot*. (2000) 25:184-192.

[2] Ruiz HA, Ruzene DS, Silva DP, Quintas MAC, Vicente AA, Teixeira JA, “Evaluation of a hydrothermal process for pretreatment of wheat straw-effect of particle size and process conditions”, *J. Chem. Technol. Biot*. (2010) *In press*.